

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problems Mailbox.**

THIS PAGE BLANK (USPTO)

(12) UK Patent Application (19) GB (11) 2 176 907 A

(43) Application published 7 Jan 1987

(21) Application No 8615142

(22) Date of filing 20 Jun 1986

(30) Priority data

(31) 8515779 (32) 21 Jun 1985 (33) GB

(71) Applicant
The General Electric Company p.l.c.,

(incorporated in United Kingdom),

1 Stanhope Gate, London W1A 1EH

(72) Inventor
Raymond Sidney Walter Assinder

(74) Agent and/or Address for Service
J. D. Dolwin, Central Patent Department (Wembley Office),
The General Electric Company p.l.c., Hirst Research Centre,
East Lane, Wembley, Middlesex

(51) INT CL⁴
G02B 6/44

(52) Domestic classification (Edition I):
G2J G15 G3 GEA

(56) Documents cited
GB A 2165661 EP A1 0043570
EP A2 0146478 US 4500166
EP A1 0101970 US 4428645
EP A2 0073023

(58) Field of search
G2J
Selected US specifications from IPC sub-class G02B

(54) Optical fibre apparatus

(57) In optical fibre apparatus in which an optical fibre is initially left longer than actually required to allow for recutting on re-connection, a surplus fibre storage housing (1) is provided with three or more upstanding walls (6, 7, 8) defining storage regions for fibre loops of at least two different lengths and one or more compartments to accommodate and locate components such as attenuators associated with the optical fibre path. The fibre loops are stored with one or more pre-set diameters of loop.

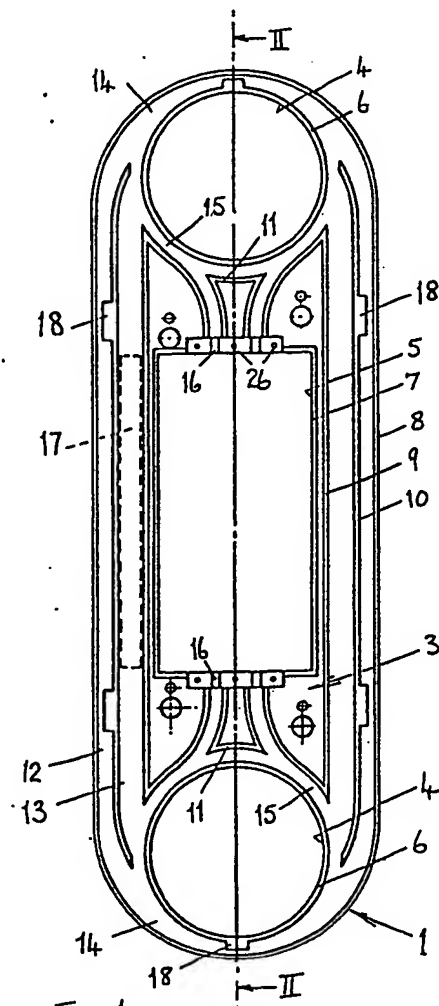
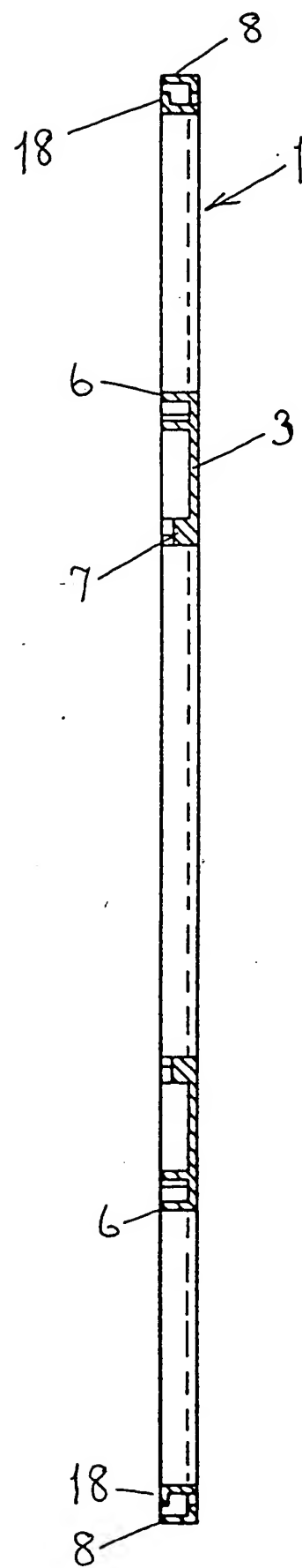
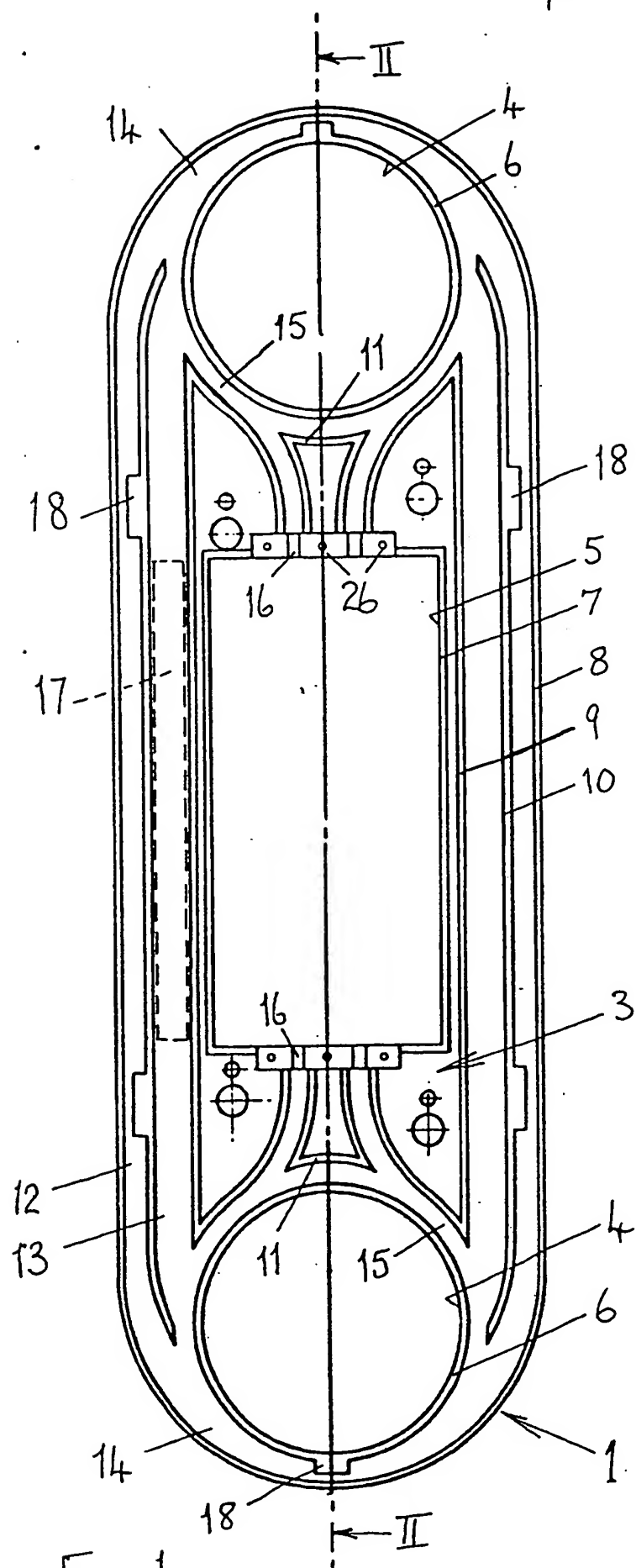


Fig. 1

GB 2 176 907

1/2



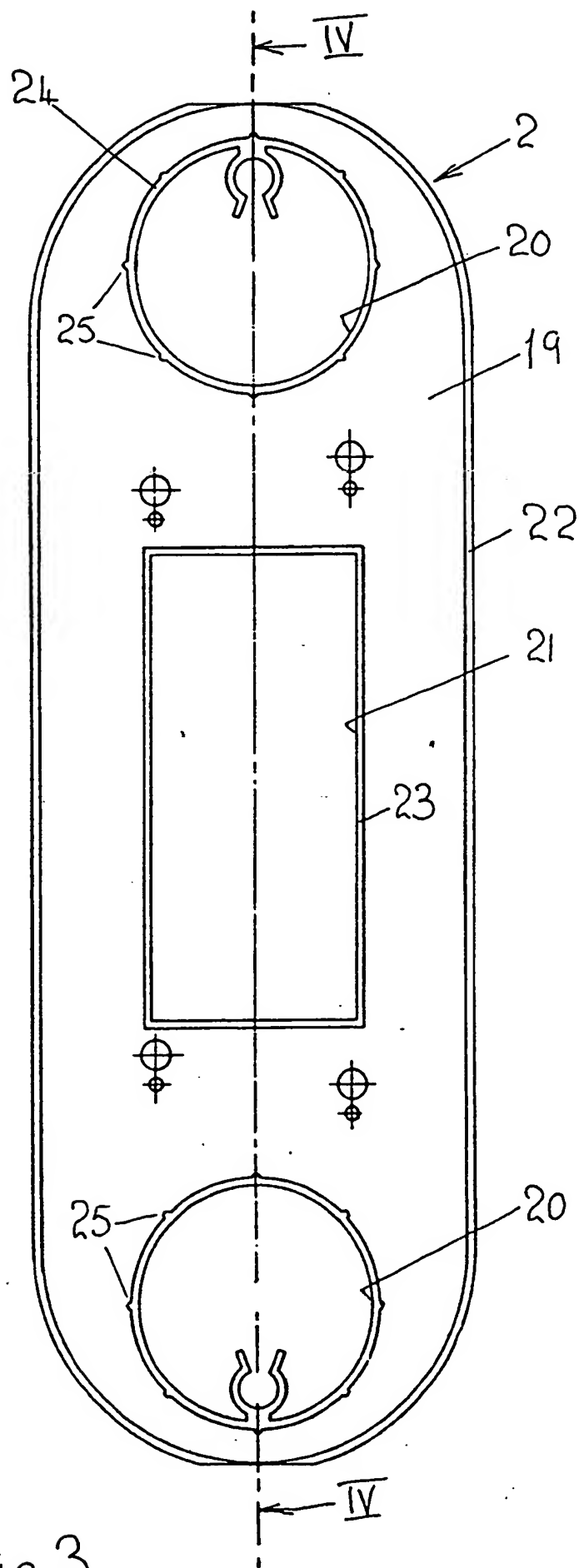


Fig. 3

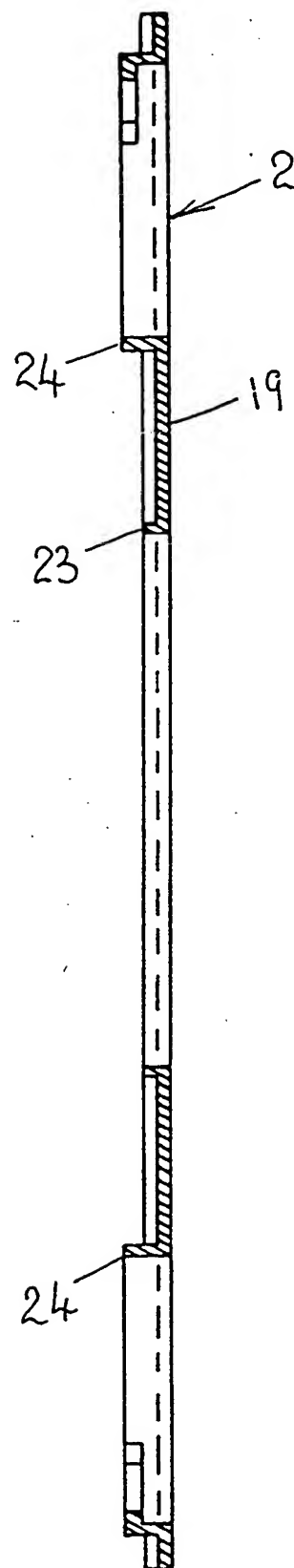


Fig. 4

SPECIFICATION

Optical fibre apparatus

- 5 The present invention relates to optical fibre apparatus.

In particular the invention is concerned with apparatus in which an optical fibre forming part of an optical signal transmission path terminates in or is connected in the apparatus.

- 10 When a signal transmission is set up it is normally expected to remain viable for a number of years before wholesale replacement becomes necessary, although during this period repairs to or
15 replacements of different parts of the system may be required from time to time.

- In the case of a line transmission system at least some of these repairs or replacements will involve disconnection and reconnection of the transmission
20 line or path. While this may be quite readily carried out with a conventional conductive transmission line, in a system utilising an optical fibre as the transmission path there is a risk of the end face of a length of fibre becoming unsuitable for reconnection
25 due to abrasion or other damage. It is therefore preferable in an optical fibre system to re-cut the fibre to provide a fresh end face each time a connection is to be made. Such a procedure reduces the length of the fibre each time by a few centimetres.

- 30 Thus when an optical fibre transmission line is installed it is desirable to leave the line longer than the point-to-point distance requires for subsequent re-cutting at each point at which disconnection and reconnection may be required. For example each
35 fibre may be made up to one metre longer to allow for, say, twenty or thirty reconnections. The extra length of fibre has to be protected from accidental damage, and from being coiled with too small a radius of curvature.

- 40 According to the present invention in optical fibre apparatus in which an optical fibre forming an optical signal transmission path terminating in or connected in said apparatus is initially left longer than is required to effect the initial termination or connection
45 of the transmission path in order to allow for re-cutting of the end-face of the fibre to be carried out on re-terminating or re-connecting the fibre in said apparatus during the lifetime of the apparatus, a housing for the surplus length of the optical fibre
50 comprises a substantially planar base member and at least three upstanding wall members secured to or formed integrally with said base member, said wall members defining an outer boundary and at least two inner boundaries between which outer and inner
55 boundaries the surplus length of said optical fibre is retained as a loop having a radius of curvature of at least a predetermined minimum value.

- Preferably said outer boundary and said two inner boundaries, with said base member, define storage
60 regions in which said surplus length of fibre may be retained selectively in loops of at least two different lengths. One or more of the upstanding wall members may be provided with one or more

that the surplus length of said optical fibre may be substantially completely enclosed.

- Optical fibre apparatus in accordance with the present invention will now be described with
70 reference to the accompanying drawings, of which:-

Figure 1 shows a plan view of a part of the apparatus,

Figure 2 shows a sectional view on the line II-II in *Figure 1*,

- 75 *Figure 3* shows a plan view of another part of the apparatus, and

Figure 4 shows a sectional view on the line IV-IV in *Figure 3*.

- Referring to the drawings the apparatus comprises
80 a two-part protective housing for an optical fibre, comprising a tray or base 1 shown in *Figures 1* and 2 and a cover or lid 2 shown in *Figures 3* and 4.

- Referring to *Figures 1* and 2, the base 1 comprises a substantially planar member 3 34.8 cms long, 11 cms
85 wide and 0.2cm thick having generally semicircular ends, with circular apertures 4 of diameter 6.6 cms adjacent each end and a centrally disposed 12.4 cms by 5.8cms rectangular aperture 5. Around the edges of the apertures 4 and 5 and around the outer edge of
90 the member 3 there are provided up-standing wall members 6, 7 and 8 respectively, these wall members being, say, 0.2cm thick and extending perpendicularly to the planar member 3 to a height of, say, 0.7cm from the planar member 3. Additional
95 upstanding wall members 9, 10 and 11, of substantially the same height and thickness as the wall members 7 and 8 are provided between the wall members 7 and 8, the additional wall members 9 and 10, over the major part of their lengths, extending
100 generally parallel to the wall members 7 and 8.

- The wall members 6, 8, 9 and 10 define what may be described as a race-track pattern of passageways comprising two parallel sections 12 and 13 on either side of the rectangular aperture 5 and a generally
105 semicircular section 14 around either end. The wall members 11, with the end portions of the wall member 9, define curving passageways 15 leading from the sections 14 to notches 16 in the wall member 7 which communicate with the aperture 5.

- 110 An optical fibre (not shown) having surplus length to be protected may enter the housing by way of one of the notches 16 and be laid in one or more loops around a wall member 6, or around wall members 6 and along one or both of the sections 12, and exit by way of another of the notches 16.

- The passageway sections 13 are each sized to hold an optical fibre attenuator, indicated in *Figure 1* in dashed outline as a long rectangular-section block 17, together with its associated connector splices (not
120 shown).

Projections 18 from the upper edges of the wall members 6 and 10 overhang the passageway sections 14 and 12, serving to retain in position any optical fibres laid in those sections.

- 125 Referring now to *Figures 3* and 4 the cover or lid 2 comprises a substantially planar member 19 of similar dimensions to the planar member 3 of the base 1, again with two circular and one rectangular

a similar rim 23 is provided around the aperture 21. Around each of the apertures 20 a somewhat higher rim 24 is provided, the radially outer face of this rim being provided with deformable ribs 25.

- 5 When the cover 2 is fitted to the base 1 the rims 24 of the cover 2 fit within the respective wall members 6 around the apertures 4 with the ribs 25 providing a friction grip on the inner faces of the wall members 6. The rim 23 of the cover 2 fits within the aperture 5 in
10 the base 1, while the rim 22 surrounds the upper edge of the wall member 8 of the base 1. In this way the passageways 12, 13, 14 and 15 in the base 1 become substantially completely enclosed, with access substantially only by way of the notches 16 in the wall
15 member 7. The regions of the wall member 7 in which the notches 16 occur may be of thicker section and lower in height than the rest of the wall member 7, as illustrated in Figures 1 and 2, and may be provided with tapped holes 26 by which a clamping and/or
20 sealing member (not shown) may be secured once the optical fibre has been laid in the passageways of the base 1.

CLAIMS

- 25 1. Optical fibre apparatus in which an optical fibre forming an optical signal transmission path terminating in or connected in said apparatus is initially left longer than is required to effect the initial
30 termination or connection of the transmission path in order to allow for re-cutting of the end-face of the fibre to be carried out on re-terminating or re-connecting the fibre in said apparatus during the lifetime of the apparatus, wherein a housing for the
35 surplus length of the optical fibre comprises a substantially planar base member and at least three up-standing wall members secured to or formed integrally with said base member, said wall members defining an outer boundary and at least two inner
40 boundaries between which outer and inner boundaries the surplus length of said optical fibre is retained as a loop having a radius of curvature of at least a predetermined minimum value.
2. Optical fibre apparatus in accordance with
45 Claim 1 wherein said outer boundary and said two inner boundaries, with said base member, define storage regions in which said surplus length of fibre may be retained selectively in loops of at least two different lengths.
- 50 3. Optical fibre apparatus in accordance with Claim 1 or Claim 2 wherein one or more of the upstanding wall members is or are provided with one or more apertures for entry and/or exit of the optical fibre.
- 55 4. Optical fibre apparatus in accordance with Claim 1, Claim 2 or claim 3 wherein the housing is provided with a detachable lid such that the surplus length of said optical fibre may be substantially completely enclosed.
- 60 5. Optical fibre apparatus in accordance with any preceding claim wherein said upstanding wall members define one or more enclosures for locating one or more discrete components associated with

hereinbefore described with reference to the accompanying drawings.

Printed in the UK for HMSO, D8818935, 11/86, 7102.
Published by The Patent Office, 25 Southampton Buildings, London,
WC2A 1AY, from which copies may be obtained.

THIS PAGE BLANK (USPTO)